Journal of MOLECULAR BIOLOGY

EDITOR-IN-CHIEF
J. C. KENDREW

ASSISTANT EDITOR
S. BRENNER

EDITORIAL BOARD
C. R. Cantor
P. Chambon
W. W. Franke
M. Gellert
G. A. Gilbert
M. Gottesman
I. Herskowitz
R. Huber
H. E. Huxley
A. Klug
V. Luzzati
J. H. Miller
M. F. Moody
K. Simons

VOLUME 165

25 March to 25 April 1983

ACADEMIC PRESS
London New York San Francisco

Copyright © 1983, by Academic Press Inc. (London) Ltd.

ALL RIGHTS RESERVED

No part of this volume may be reproduced in any form, by photostat, microfilm, or any other means, without written permission from the publishers.

Printed in Great Britain

CONTENTS OF VOLUME 165

Number 1, 25 March 1983

Iida, S., Meyer, J., Bächi, B., Stålhammar-Carlemalm, M., Schrickel, S., Bickle, T. A. and Arber, W., DNA Restriction–Modification Genes of Phage P1 and Plasmdid p15B. Structure and *in Vitro* Transcription . 1

Hadi, S. M., Bächi, B., Iida, S. and Bickle, T. A., DNA Restriction–Modification Enzymes of Phage P1 and Plasmid p15B. Subunit Functions and Structural Homologies 19

Southgate, R., Ayme, A. and Voellmy, R., Nucleotide Sequence Analysis of the *Drosophila* Small Heat Shock Gene Cluster at Locus 67B . . 35

Carnevali, F., Caserta, M. and Di Mauro, E., Topological Modifications and Template Activation are Induced in Chimaeric Plasmids by Inserted Sequences. 59

Kim, C. H. and Warner, J. R., Messenger RNA for Ribosomal Proteins in Yeast 79

Kouyama, T., Kinosita, K. Jr and Ikegami, A., Fluorescence Energy Transfer Studies of Transmembrane Location of Retinal in Purple Membrane 91

Appendix 103

Muller, E. D. and Cronan, J. E. Jr, The Lipid-containing Bacteriophage PR4. Effects of Altered Lipid Composition on the Virion . . . 109

Bianconi, A., Giovannelli, A., Castellani, L., Alemà, S., Fasella, P., Oesch, B. and Mobilio, S., X-ray Absorption Near Edge Structure (XANES) Determination of Calcium Sites of Troponin C and Parvalbumin 125

Kendrick-Jones, J., Cande, W. Z., Tooth, P. J., Smith, R. C. and Scholey, J. M., Studies on the Effect of Phosphorylation of the 20,000 M_r Light Chain of Vertebrate Smooth Muscle Myosin 139

Bardsley, W. G. and Wright, A. J., A New Approach to the Measurement of Sigmoid Curves with Enzyme Kinetic and Ligand Binding Data . 163

Appendix 178

Letters to the Editor

Chandler, M. and Galas, D. J., IS*1*-mediated Tandem Duplication of Plasmid pBR322. Dependence on *recA* and on DNA Polymerase I. 183

Meyer, J., Iida, S. and Arber, W., Physical Analysis of the Genomes of Hybrid Phages Between Phage P1 and Plasmid p15B . . . 191

Roy, A., Danchin, A., Joseph, E. and Ullmann, A., Two Functional Domains in Adenylate Cyclase of *Escherichia coli* 197

ROSE, D. R., SEATON, B. A., PETSKO, G. A., NOVOTNÝ, J., MARGOLIES, M. N., LOCKE, E. and HABER, E., Crystallization of the Fab Fragment of a Monoclonal Anti-digoxin Antibody and Its Complexes with Digoxin 203

ERRATUM 207

NUMBER 2, 5 APRIL 1983

KOMINAMI, R., URANO, Y., MISHIMA, Y., MURAMATSU, M., MORIWAKI, K. and YOSHIKURA, H., Novel Repetitive Sequence Families Showing Size and Frequency Polymorphism in the Genomes of Mice. 209

OWEN, J. E., SCHULTZ, D. W., TAYLOR, A. and SMITH, G. R., Nucleotide Sequence of the Lysozyme Gene of Bacteriophage T4. Analysis of Mutations Involving Repeated Sequences 229

BROWN, S. D. M. and PIECHACZYK, M., Insertion Sequences and Tandem Repetitions as Sources of Variation in a Dispersed Repeat Family . 249

KOLE, L. B., HAYNES, S. R. and JELINEK, W. R., Discrete and Heterogeneous High Molecular Weight RNAs Complementary to a Long Dispersed Repeat Family (a Possible Transposon) of Human DNA . . . 257

KARLSSON, B., HOVMÖLLER, S., WEISS, H. and LEONARD, K., Structural Studies of Cytochrome Reductase. Subunit Topography Determined by Electron Microscopy of Membrane Crystals of a Subcomplex . . 287

VIBERT, P. and CRAIG, R., Electron Microscopy and Image Analysis of Myosin Filaments from Scallop Striated Muscle 303

THOMAS, G. J., JR, PRESCOTT, B., DAY, L. A., Structure Similarity, Difference and Variability in the Filamentous Viruses fd, If1, IKe, Pf1 and Xf. Investigations by Laser Raman Spectroscopy 321

WINKELMANN, D. A. and KAHAN, L., Immunochemical Accessibility of Ribosomal Protein S4 in the 30 S Ribosome. The Interaction of S4 with S5 and S12 357

LESLIE, A. G. W. and WONACOTT, A. J., Coenzyme Binding in Crystals of Glyceraldehyde-3-phosphate Dehydrogenase 375

LETTERS TO THE EDITOR

WAIS-STEIDER, C., EAGLES, P. A. M., GILBERT, D. S. and HOPKINS, J., Structural Similarities and Differences Amongst Neurofilaments . 393

HOVMÖLLER, S., SLAUGHTER, M., BERRIMAN, J., KARLSSON, B., WEISS, H. and LEONARD, K., Structural Studies of Cytochrome Reductase. Improved Membrane Crystals of the Enzyme Complex and Crystallization of a Subcomplex 401

GOLDENBERG, D. P. and CREIGHTON, T. E., Circular and Circularly Permuted Forms of Bovine Pancreatic Trypsin Inhibitor . . 407

AMIT, A. G., HARPER, M. M., MARIUZZA, R. A., SALUDJIAN, P., POLJAK, R. J., LAMOYI, E. and NISONOFF, A., Preliminary Crystallographic Study of the Fab Fragment of a Monoclonal Anti-phenylarsonate Antibody. 415

NUMBER 3, 15 APRIL 1983

DENHARDT, D. T. and MIYAMOTO, C., Characteristics of the Nascent and Non-nascent Small DNA Molecules Found in *Escherichia coli* . . . 419

BARNES, W. M. and TULEY, E., DNA Sequence Changes of Mutations in the Histidine Operon Control Region that Decrease Attenuation. . . 443

LITTELMAN, B., ZANDOMENI, R. and WEINMANN, R., Mechanism of Action of 5,6-Dichloro-1-β-D-ribofuranosylbenzimidazole. II. A Resistant Human Cell Mutant with an Altered Transcriptional Machinery . . . 461

SVENSSON, C., PETTERSSON, U. and AKUSJÄRVI, G., Splicing of Adenovirus 2 Early Region 1A mRNAs is Non-sequential 475

Appendix: VIRTANEN, A. and PETTERSSON, U., The Molecular Structure of the 9 S mRNA from Early Region 1A of Adenovirus Serotype 2 496

NORRIS, G. E., ANDERSON, B. F. and BAKER, E. N., Structure of Azurin from *Alcaligenes denitrificans* at 2·5 Å Resolution 501

WAGENKNECHT, T., FRANCIS, N. and DEROSIER, D. J., α-Ketoglutarate Dehydrogenase Complex may be Heterogeneous in Quaternary Structure 523

Appendix: MONSKY, P., The Number of E2-$E1_6$ Isomers . . . 539

ANTONINI, E., ASCENZI, P., BOLOGNESI, M., GATTI, G., GUARNERI, M. and MENEGATTI, E., Interaction between Serine (Pro)enzymes, and Kazal and Kunitz Inhibitors 543

LETTERS TO THE EDITOR

MARIUZZA, R. A., POLJAK, R. J., MIHAESCO, C. and MIHAESCO, E., Crystals of the Human Heavy Chain Disease Protein Riv and Human Fc Fragment are Isomorphous: Further Evidence for Conformational Flexibility in the Hinge Region of Immunoglobulins . . . 559

SCHIERBEEK, A. J., VAN DER LAAN, J. M., GROENDIJK, H., WIERENGA, R. K. and DRENTH, J., Crystallization and Preliminary X-ray Investigation of Lipoamide Dehydrogenase from *Azotobacter vinelandii* 563

ANNOUNCEMENT 565

NUMBER 4, 25 APRIL 1983

LAM, B. S. and CARROLL, D., Tandemly Repeated DNA Sequences from *Xenopus laevis*. I. Studies on Sequence Organization and Variation in Satellite 1 DNA (741 Base-pair Repeat). 567

LAM, B. S. and CARROLL, D., Tandemly Repeated DNA Sequences from *Xenopus laevis*. II. Dispersed Clusters of a 388 Base-pair Repeating Unit 587

ZANNIS-HADJOPOULOS, M., CHEPELINSKY, A. B. and MARTIN, R. G., Mapping of the 3′-End Positions of Simian Virus 40 Nascent Strands 599

JACOBS, H. T., POSAKONY, J. W., GRULA, J. W., ROBERTS, J. W., XIN, J.-H., BRITTEN, R. J. and DAVIDSON, E. H., Mitochondrial DNA Sequences in the Nuclear Genome of *Strongylocentrotus purpuratus* 609

FERSHT, A. R. and KNILL-JONES, J. W., Fidelity of Replication of Bacteriophage ϕX174 DNA *in Vitro* and *in Vivo* 633

FERSHT, A. R., SHI, J.-P. and TSUI, W.-C., Kinetics of Base Misinsertion by DNA Polymerase I of *Escherichia coli* 655

FERSHT, A. R. and KNILL-JONES, J. W., Contribution of $3' \rightarrow 5'$ Exonuclease Activity of DNA Polymerase III Holoenzyme from *Escherichia coli* to Specificity 669

GOUGH, N. M., Core and E Antigen Synthesis in Rodent Cells Transformed with Hepatitis B Virus DNA is Associated with Greater than Genome Length Viral Messenger RNAs 683

DORSET, D. L., ENGEL, A., HÄNER, M., MASSALSKI, A. and ROSENBUSCH, J. P., Two-dimensional Crystal Packing of Matrix Porin. A Channel Forming Protein in *Escherichia coli* Outer Membranes 701

ROSSMANN, M. G., ABAD-ZAPATERO, C., MURTHY, M. R. N., LILJAS, J., JONES, T. A. and STRANDBERG, B., Structural Comparisons of Some Small Spherical Plant Viruses 711

SMITH, W. W., PATTRIDGE, K. A., LUDWIG, M. L., PETSKO, G. A., TSERNOGLOU, D., TANAKA, M. and YASUNOBU, K. T., Structure of Oxidized Flavodoxin from *Anacystis nidulans*. 737

Appendix: TARR, G. E., Determination of the Sequence which Spans the Beginning of the Insertion Region in *Anacystis nidulans* Flavodoxin 754

BANERJEE, U., TSUI, F.-P., BALASUBRAMANIAN, T. N., MARSHALL, G. R. and CHAN, S. I., Structure of Alamethicin in Solution. One- and Two-dimensional ^{1}H Nuclear Magnetic Resonance Studies at 500 MHz. . . 757

Index to Volume 165

Abad-Zapatero, C. (see also Rossmann, M. G.), 711
Adenovirus 2 early region 1A, molecular structure of the 9 S mRNA, 496
— — — — — mRNA splicing is non-sequential, 475
Adenylate cyclase of *Escherichia coli* has two functional domains, 197
Akusjärvi, G. (see also Svensson, C.), 475
Alamethicin in solution, structure by ^{1}H n.m.r. studies at 500 MHz, 757
Alcaligenes denitrificans, structure of azurin at 2·5 Å resolution, 501
Alemà, S. (see also Bianconi, A.), 125
Amit, A. G., Harper, M. M., Mariuzza, R. A., Saludjian, P., Poljak, R. J., Lamoyi, E. & Nisonoff, A., Preliminary crystallographic study of the Fab fragment of a monoclonal anti-phenylarsonate, 415
Anacystis nidulans flavodoxin, determination of the sequence which spans the beginning of the insertion region, 754
— —, structure of oxidized flavodoxin, 737
Anderson, B. F. (see also Norris, G. E.), 501
Antibody, anti-digoxin, monoclonal, crystallization of the Fab fragment and its complex with digoxin, 203
Antigen synthesis, core and E, in rodent cells transformed with hepatitis B virus DNA is associated with greater than genome length viral mRNAs, 683
Anti-phenylarsonate antibody, monoclonal, preliminary crystallographic study of the Fab fragment, 415
Antonini, E., Ascenzi, P., Bolognesi, M., Gatti, G., Guarneri, M. & Menegatti, E., Interaction between serine (pro)enzymes and Kazal and Kunitz inhibitors, 543
Arber, W. (see also Iida, S.), 1
— (see also Meyer, J.), 191
Ascenzi, P. (see also Antonini, E.), 543
Ayme, A. (see also Southgate, R.), 35
Azotobacter vinelandii lipoamide dehydrogenase, crystallization and preliminary X-ray investigation, 563
Azurin from *Alcaligenes denitrificans*, structure at 2·5 Å resolution, 501

Bächi, B. (see also Hadi, S. M.), 19
— (see also Iida, S.), 1
Bacteriophage P1, physical analysis of the genomes of hybrid phages with plasmid p15B, 191
— ϕX174 DNA, fidelity of replication *in vitro* and *in vivo*, 633
— PR4, lipid-containing; effects of altered lipid composition on the virion, 109
— T4, nucleotide sequence of the lysozyme gene; analysis of mutations involving repeated sequences, 229
Baker, E. N. (see also Norris, G. E.), 501
Balasubramanian, T. N. (see also Banerjee, U.), 757
Banerjee, U., Tsui, F.-P., Balasubramanian, T. N., Marshall, G. R. & Chan, S. I., Structure of alamethicin in solution. One- and two-dimensional ^{1}H nuclear magnetic resonance studies at 5000 MHz, 757
Bardsley, W. G. & Wright, A. J., A new approach to the measurement of sigmoid curves with enzyme kinetic and ligand binding data, 163
Barnes, W. M. & Tuley, E., DNA sequence changes of mutations in the histidine operon control region that decrease attenuation, 443
Base misinsertion by DNA polymerase I of *Escherichia coli*, kinetics, 655
Berriman, J. (see also Hovmöller, S.), 401
Bianconi, A., Giovannelli, A., Castellani, L., Alemà, S., Fasella, P., Oesch, B. & Mobilio, S., X-ray absorption near edge structure (XANES) determination of calcium sites of troponin C and parvalbumin, 125
Bickle, T. A. (see also Hadi, S. M.), 19
— (see also Iida, S.), 1
Bolognesi, M. (see also Antonini, E.), 543

Bovine pancreatic trypsin inhibitor, circular and circularly permuted forms, 407
Britten, R. J. (see also Jacobs, H. T.), 609
Brown, S. D. M. & Piechaczyk, M., Insertion sequences and tandem repetitions as sources
variation in a dispersed repeat family, 249

Calcium sites of troponin C and parvalbumin, X-ray absorption near edge structure determination, 12
Cande, W. Z. (see also Kendrick-Jones, J.), 139
Carnevali, F., Caserta, M. & Di Mauro, E., Topological modifications and template activation ar
induced in chimaeric plasmids by inserted sequences, 59
Carroll, D. (see also Lam, B. S.), 567, 587
Caserta, M. (see also Carnevali, F.), 59
Castellani, L. (see also Bianconi, A.), 125
Chan, S. I. (see also Banerjee, U.), 757
Chandler, M. & Galas, D. J., IS*1*-mediated tandem duplication of plasmid pBR322. Dependence o
recA and on DNA polymerase I, 183
Channel forming protein in *Escherichia coli* outer membranes; two-dimensional crystal packing o
matrix porin, 701
Chepelinsky, A. B. (see also Zannis-Hadjopoulos, M.), 599
Chimaeric plasmids, topological modifications and template activation are induced by inserte
sequences, 59
Circular and circularly permuted forms of bovine pancreatic trypsin inhibitor, 407
Coenzyme binding in crystals of glyceraldehyde-3-phosphate dehydrogenase, 375
Conformational flexibility in the hinge region of immunoglobulins; crystals of the human heavy chai
disease protein Riv and human Fc fragment are isomorphous, 559
Craig, R. (see also Vibert, P.), 303
Creighton, T. E. (see also Goldenberg, D. P.), 407
Cronan, J. E. Jr (see also Muller, E. D.), 109
Crystal packing, two-dimensional, of matrix porin. A channel forming protein in *Escherichia coli* outer
membranes, 701
Crystallization and preliminary X-ray investigation of lipoamide dehydrogenase from *Azotobacter
vinelandii*, 563
— of the Fab fragment of a monoclonal anti-digoxin antibody and its complex with digoxin, 203
Crystallographic study, preliminary, of the Fab fragment of a monoclonal anti-phenylarsonate
antibody, 415
Crystals of the human heavy chain disease protein Riv and Fc fragment are isomorphous: further
evidence for conformational flexibility in the hinge region of immunoglobulins, 559
Cytochrome reductase structural studies. Improved membrane crystals of the enzyme complex and
crystallization of a subcomplex, 401
— — — —; subunit topography determined by electron microscopy of membrane crystals of a
subcomplex, 287

Danchin, A. (see also Roy, A.), 197
Davidson, E. H. (see also Jacobs, H. T.), 609
Day, L. A. (see also Thomas, G. J. Jr), 321
Denhardt, D. T. & Miyamoto, C., Characteristics of the nascent and non-nascent small DNA
molecules found in *Escherichia coli*, 419
DNA of bacteriophage ϕX174, fidelity of replication *in vitro* and *in vivo*, 633
—, human, discrete and heterogeneous high molecular weight RNAs complementary to a long
dispersed repeat family (a possible transposon), 257
— molecules, small, nascent and non-nascent, in *Escherichia coli*, 419
— polymerase I dependence of IS*1*-mediated tandem duplication of plasmid pBR322, 183
— — — of *Escherichia coli*, kinetics of base misinsertion, 655
— polymerase III holoenzyme from *Escherichia coli*, contribution of $3' \rightarrow 5'$ exonuclease activity t
specificity, 669
— restriction–modification genes of phage P1 and plasmid p15B; structure and *in vitr*
transcription, 1
— — — — enzymes of phage P1 and plasmid p15B; subunit functions and structural homologies, 19
— sequence changes of mutations in the histidine operon control region that decrease attenuation, 44
— sequences, mitochondrial, in the nuclear genome of *Strongylocentrotus purpuratus*, 609
DeRosier, D. J. (see also Wagenknecht, T.), 523
Di Mauro, E. (see also Carnevali, F.), 59

5,6-Dichloro-1-β-D-ribofuranosylbenzimidazole, mechanism of action; a resistant human cell mutant with an altered transcriptional machinery, 461
Digoxin, crystallization of complex with the Fab fragment of a monoclonal anti-digoxin antibody, 203
Dispersed clusters of a 388 base-pair repeating unit; tandemly repeated DNA sequences from *Xenopus laevis*, 587
— repeat family (a possible transposon) of human DNA, complementary discrete and heterogeneous high molecular weight RNAs, 257
— — —, insertion sequences and tandem repetitions as sources of variation, 249
Dorset, D. L., Engel, A., Häner, M., Massalski, A. & Rosenbusch, J. P., Two-dimensional crystal packing of matrix porin. A channel forming protein in *Escherichia coli* outer membranes, 701
Drenth, J. (see also Schierbeek, A. J.), 563
Drosophila small heat shock gene cluster at locus 67B, nucleotide sequence analysis, 35

$E2\text{-}El_6$ isomer numbers, 539
Eagles, P. A. M. (see also Wais-Steider, C.), 393
Early region 1A mRNAs of adenovirus 2, splicing is non-sequential, 475
— — 1A 9 S mRNA of adenovirus 2, the molecular structures, 496
Electron microscopy and image analysis of myosin filaments from scallop striated muscle, 303
— — of membrane crystals of a subcomplex of cytochrome reductase, 287
Energy transfer studies of transmembrane location of retinal in purple membrane, 91
Engel, A. (see also Dorset, D. L.), 701
Enzyme kinetic and ligand binding data, use in new approach to the measurement of sigmoid curves, 163
Enzymes, DNA restriction–modification, of phage P1 and plasmid p15B; subunit functions and structural homologies, 19
Escherichia coli, a channel forming protein in outer membranes; two-dimensional crystal packing of matrix porin, 701
— —, characteristics of nascent and non-nascent small DNA molecules, 419
— —, contribution of $3' \rightarrow 5'$ exonuclease activity of DNA polymerase III holoenzyme to specificity, 669
— —, two functional domains in adenylate cyclase, 197
— —, kinetics of base misinsertion by DNA polymerase I, 655

Fab fragment of a monoclonal anti-digoxin antibody and its complex with digoxin, crystallization, 203
— — — — — — anti-phenylarsonate antibody, preliminary crystallographic study, 415
Fasella, P. (see also Bianconi, A.), 125
Fc fragment, human, and human heavy chain disease protein Riv crystals are isomorphous: further evidence for conformational flexibility in the hinge region of immunoglobulins, 559
fd (see also Viruses, filamentous), 321
Fersht, A. R. & Knill-Jones, J. W., Contribution of $3' \rightarrow 5'$ exonuclease activity of DNA polymerase III holoenzyme from *Escherichia coli* to specificity, 669
— & — —, Fidelity of replication of bacteriophage ϕX174 DNA *in vitro* and *in vivo*, 633
—, Shi, J.-P. & Tsui, W.-C., Kinetics of base misinsertion by DNA polymerase I of *Escherichia coli*, 655
Filamentous viruses fd, If1, IKe, Pf1 and Xf, structure similarity, difference and variability studied by laser Raman spectroscopy, 321
Filaments, myosin, from scallop striated muscle, electron microscopy and image analysis, 303
Flavodoxin from *Anacystis nidulans*, determination of the sequence which spans the beginning of the insertion region, 754
—, oxidized, from *Anacystis nidulans*, structure determination, 737
Fluorescence energy transfer studies of transmembrane location of retinal in purple membrane, 91
Francis, N. (see also Wagenknecht, T.), 523

Galas, D. J. (see also Chandler, M.), 183
Gatti, G. (see also Antonini, E.), 543
Gene cluster, small heat shock, *Drosophila*, at locus 67B; nucleotide sequence analysis, 35
—, lysozyme, T4, nucleotide sequence; analysis of mutations involving repeated sequences, 229
Genome, nuclear, of *Strongylocentrotus purpuratus*, mitochondrial DNA sequences, 609
Genomes of hybrid phages between phage P1 and plasmid p15B, physical analysis, 191
— — mice, novel repetitive sequence families showing size and frequency polymorphism, 209

Genes, DNA restriction–modification, of phage P1 and plasmid p15B; structure and *in vitro* transcription, 1
Gilbert, D. S. (see also Wais-Steider, C.), 393
Giovannelli, A. (see also Bianconi, A.), 125
Glyceraldehyde-3-phosphate dehydrogenase crystals, coenzyme binding, 375
Goldenberg, D. P. & Creighton, T. E., Circular and circularly permuted forms of bovine pancreatic trypsin inhibitor, 407
Gough, N. M., Core and E antigen synthesis in rodent cells transformed with hepatitis B virus DNA is associated with greater than genome length viral messenger RNAs, 683
Groendijk, H. (see also Schierbeek, A. J.), 563
Grule, J. W. (see also Jacobs, H. T.), 609
Guarneri, M. (see also Antonini, E.), 543

^{1}H nuclear magnetic resonance studies at 500 MHz, one- and two-dimensional, of structure of alamethicin in solution, 757
Haber, E. (see also Rose, D. R.), 203
Hadi, S. M., Bächi, B., Iida, S. & Bickle, T. A., DNA restriction–modification enzymes of phage P1 and plasmid p15B. Subunit functions and structural homologies, 19
Häner, M. (see also Dorset, D. L.), 701
Harper, M. M. (see also Amit, A. G.), 415
Haynes, S. R. (see also Kole, L. B.), 257
Heat shock gene cluster, small, *Drosophila*, at locus 67B; nucleotide sequence analysis, 35
Heavy chain disease protein Riv and human Fc fragment crystals are isomorphous: further evidence for conformational flexibility in the hinge region of immunoglobulins, 559
Hepatitis B virus DNA-transformed rodent cells, core and E antigen synthesis is associated with greater than genome length viral mRNAs, 683
Hinge region of immunoglobulins, further evidence for conformational flexibility; crystals of the human heavy chain disease protein Riv and human Fc fragment are isomorphous, 559
Histidine operon control region, DNA sequence changes of mutations that decreases attenuation, 443
Hopkins, J. (see also Wais-Steider, C.), 393
Hovmöller, S., Slaughter, M., Berriman, J., Karlsson, B., Weiss, H. & Leonard, K., Structural studies of cytochrome reductase. Improved membrane crystals of the enzyme complex and crystallization of a subcomplex, 401
— (see also Karlsson, B.), 287
Human cell mutant, resistant, with an altered transcriptional machinery; the mechanism of action of 5,6-dichloro-1-β-D-ribofuranosylbenzimidazole, 461
— heavy chain disease protein Riv and human Fc fragment crystals are isomorphous: further evidence for conformational flexibility in the hinge region of immunoglobulins, 559
— DNA, discrete and heterogeneous high molecular weight RNAs complementary to a long dispersed repeat family (a possible transposon), 257
Hybrid phages between phage P1 and plasmid p15B, physical analysis of the genomes, 191

If1 (see also Viruses, filamentous), 321
Iida, S., Meyer, J., Bächi, B., Stålhammar-Carlemalm, M., Schrickel, S., Bickle, T. A. & Arber, W., DNA restriction–modification genes of phage P1 and plasmid p15B. Structure and *in vitro* transcription, 1
— (see also Hadi, S. M.), 19
— (see also Meyer, J.), 191
IKe (see also Viruses, filamentous), 321
Ikegami, A. (see also Kouyama, T.), 91
Immunochemical accessibility of ribosomal protein S4 in the 30 S ribosome; the interaction of S4 with S5 and S12, 357
Immunoglobulins, further evidence for conformational flexibility in the hinge region; crystals of the human heavy chain disease protein Riv and human Fc fragment are isomorphous, 559
Inserted sequences induce topological modifications and template activation in chimaeric plasmids, 59
Insertion region in *Anacystic nidulans* flavodoxin, determination of the sequence which spans the beginning, 754
— sequences and tandem repetitions as sources of variation in a dispersed repeat family, 249
IS*1*-mediated tandem duplication of plasmid pBR322; dependence on *recA* and on DNA polymerase I, 183

Jacobs, H. T., Posakony, J. W., Grula, J. W., Roberts, J. W., Xin, J.-H., Britten, R. J. & Davidson, E. H., Mitochondrial DNA sequences on the nuclear genome of *Strongylocentrotus purpuratus*, 609
Jelinek, W. R. (see also Kole, L. B.), 257
Jones, T. A. (see also Rossman, M. G.), 711

Kahan, L. (see also Winkelmann, D. A.), 357
Karlsson, B., Hovmöller, S., Weiss, H. & Leonard, K., Structural studies of cytochrome reductase. Subunit topography determined by electron microscopy of membrane crystals of a subcomplex, 287
— (see also Hovmöller, S.), 401
Kazal and Kunitz inhibitors, interaction with serine (proenzymes), 543
Kendrick-Jones, J., Cande, W. Z., Tooth, P. J., Smith, R. C. & Scholey, J. M., Studies on the effect of phosphorylation of the 20,000 M_r light chain of vertebrate smooth muscle myosin, 139
α-Ketoglutarate dehydrogenase complex may be heterogeneous in quaternary structure, 523
Kim, C. H. & Warner, J. R., Messenger RNA for ribosomal proteins in yeast, 79
Kinetics of base misinsertion by DNA polymerase I of *Escherichia coli*, 655
Kinosita, K. Jr (see also Kouyama, T.), 91
Knill-Jones, J. W. (see also Fersht, A. R.), 633, 669
Kole, L. B., Haynes, S. R. & Jelinek, W. R., Discrete and heterogeneous high molecular weight RNAs complementary to a long dispersed repeat family (a possible transposon) of human DNA, 257
Kominami, R., Urano, Y., Mishima, Y., Muramatsu, M., Moriwaki, K. & Yoshikura, H., Novel repetitive sequence families showing size and frequency polymorphism in the genomes of mice, 209
Kouyama, T., Kinosita, K. Jr & Ikegami, A., Fluorescence energy transfer studies of transmembrane location of retinal in purple membrane, 91
Kunitz and Kazal inhibitors, interaction with serine (pro)enzymes, 543

Lam, B. S. & Carroll, D., Tandemly repeated DNA sequences from *Xenopus laevis*. I. Studies on sequence organization and variation in satellite 1 DNA (741 base-pair repeat), 567
— & —, — — — — — — — —. II. Dispersed clusters of a 388 base-pair repeating unit, 587
Lamoyi, E. (see also Amit, A. G.), 415
Laser Raman spectroscopic investigation of structure similarity, difference and variability in the filamentous viruses fd, If1, IKe, Pf1 and Xf, 321
Leonard, K. (see also Hovmöller, S.), 401
— (see also Karlsson, B.), 287
Leslie, A. G. W. & Wonacott, A. J., Coenzyme binding in crystals of glyceraldehyde-3-phosphate dehydrogenase, 375
Ligand binding and enzyme kinetic data, use in new approach to the measurement of sigmoid curves, 163
Liljas, J. (see also Rossmann, M. G.), 711
Lipid-containing bacteriophage PR4. Effects of altered lipid composition on the virion, 109
Lipoamide dehydrogenase from *Azotobacter vinelandii*, crystallization and preliminary X-ray investigation, 563
Locke, E. (see also Rose, D. R.), 203
Ludwig, M. L. (see also Smith, W. W.), 737
Lysozyme gene of bacteriophage T4, nucleotide sequence; analysis of mutations involving repeated sequences, 229

Mapping of the 3′-end positions of Simian virus 40 nascent strands, 599
Margolies, M. N. (see also Rose, D. R.), 203
Mariuzza, R. A., Poljak, R. J., Mihaesco, C. & Mihaesco, E., Crystals of the human heavy chain disease protein Riv and human Fc fragment are isomorphous: further evidence for conformational flexibility in the hinge region of immunoglobulins, 559
— (see also Amitt, A. G.), 415
Marshall, G. R. (see also Banerjee, U.), 757
Martin, R. G. (see also Zannis-Hadjopoulos, M.), 599
Massalski, A. (see also Dorset, D. L.), 701
Matrix porin two-dimensional crystal packing: a channel forming protein in *Escherichia coli* outer membranes, 701

Membrane crystals, improved, of the enzyme complex and crystallization of a subcomplex of cytochrome reductase, 401
— — of a subcomplex of cytochrome reductase, subunit topography determined by electron microscopy, 287
Menegatti, E. (see also Antonini, E.), 543
Messenger RNA for ribosomal proteins in yeast, 79
— —, 9 S, from adenovirus 2 early region 1A, the molecular structure, 496
— RNAs, adenovirus 2 early region 1A, splicing is non-sequential, 475
— —, viral, greater than genome length, are associated with core and E antigen synthesis in rodent cells transformed with hepatitis B virus DNA, 683
Meyer, J., Iida, S. & Arber, W., Physical analysis of the genomes of hybrid phages between phage P1 and plasmid p158B, 191
— (see also Iida, S.), 1
Mice genomes, novel repetitive sequence families showing size and frequency polymorphism, 209
Mihaesco, C. (see also Mariuzza, R. A.), 559
Mihaesco, E. (see also Mariuzza, R. A.), 559
Mishima, Y. (see also Kominami, R.), 209
Misinsertion kinetics for DNA polymerase I of *Escherichia coli*, 655
Mitochondrial DNA sequences in the nuclear genome of *Strongylocentrotus purpuratus*, 609
Mittelman, B., Zandomeni, R. & Weinmann, R., Mechanism of action of 5,6-dichloro-1-β-D-ribofuranosylbenzimidazole. II. A resistant human cell mutant with an altered transcriptional machinery, 461
Miyamoto, C. (see also Denhardt, D. T.), 419
Mobilio, S. (see also Bianconi, A.), 125
Molecular structure of the 9 S mRNA from early region 1A of adenovirus 2, 496
Monoclonal anti-digoxin antibody, crystallization of the Fab fragment and its complex with digoxin, 203
— anti-phenylarsonate antibody, preliminary crystallographic study of the Fab fragment, 415
Monsky, P. The number of E2-E1$_6$ isomers (*Appendix* to Wagenknecht, T. *et al.*, 523), 539
Moriwaki, K. (see also Kominami, R.), 209
Muller, E. D. & Cronan, J. E. Jr, The lipid-containing bacteriophage PR4. Effects of altered lipid composition on the virion, 109
Muramatsu, M. (see also Kominami, R.), 209
Murthy, M. R. N. (see also Rossmann, M. G.), 711
Muscle, smooth, vertebrate, the effect of phosphorylation of the 20,000 M_r light chain of myosin, 139
—, striated, scallop, electron microscopy and image analysis of myosin filaments, 303
Mutations in the histidine operon control region that decrease attenuation, DNA sequence changes, 443
— involving repeated sequences; nucleotide sequence of the T4 lysozyme gene, 229
Myosin filaments from scallop striated muscle, electron microscopy and image analysis, 303
—, vertebrate smooth muscle, the effect of phosphorylation of the 20,000 M_r light chain, 139

Nascent and non-nascent small DNA molecules found in *Escherichia coli*, 419
— strands of SV40, mapping of the 3′-end positions, 599
Neurofilaments, structural similarities and differences, 393
Nisonoff, A. (see also Saludjuan, P.), 415
Norris, G. E., Anderson, B. F. & Baker, E. N., Structure of azurin from *Alcaligenes denitrificans* at 2·5 Å resolution, 501
Novotny, J. (see also Rose, D. R.), 203
Nuclear genome of *Strongylocentrotus purpuratus*, mitochondrial DNA sequences, 609
Nucleotide sequence analysis of the *Drosophila* small heat shock gene at locus 67B, 35
— — of the lysozyme gene of bacteriophage T4. Analysis of mutations involving repeated sequences, 229

Oesch, B. (see also Bianconi, A.), 125
Owen, J. E., Schultz, D. W., Taylor, A. & Smith, G. R., Nucleotide sequence of the lysozyme gene of bacteriophage T4. Analysis of mutations involving repeated sequences, 229

P1 (see also Bacteriophage), 191
— (see also Prophage), 1, 19
Parvalbumin and troponin C, determination of calcium sites using X-ray absorption near edge structure, 125

ATTRIDGE, K. A. (see also SMITH, W. W.), 737
BR322 plasmid, IS*1*-mediated tandem duplication; dependence on *recA* and on DNA polymerase I, 183
15B plasmid and phage P1, DNA restriction–modification enzymes; subunit functions and structural homologies, 19
- — — — —, — ——— genes; structure and *in vitro* transcription, 1
- —, physical analysis of the genomes of hybrid phages with phage P1, 191
ETSKO, G. A. (see also ROSE, D. R.), 203
- (see also SMITH, W. W.), 737
ETERSSON, U. (see also SVENSSON, C.), 475
- (see also VIRTANEN, A.), 496
f1 (see also Viruses, filamentous), 321
X174 (see also Bacteriophage), 633
hosphorylation of the 20,000 M_r light chain of vertebrate smooth muscle myosin, 139
hysical analysis of the genomes of hybrid phages between phage P1 and plasmid p15B, 191
IECHACZYK, M. (see also BROWN, S. D. M.), 249
lant viruses, spherical, small, structural comparisons, 711
lasmid p15B, physical analysis of the genomes of hybrid phages with phage P1, 191
- — and phage P1, DNA restriction–modification enzymes; subunit functions and structural homologies, 19
- — — — —, — ——— genes; structure and *in vitro* transcription, 1
- pBR322, IS*1*-mediated tandem duplication; dependence on *recA* and on DNA polymerase I, 183
OLJAK, R. J. (see also AMITT, A. G.), 415
- (see also MARIUZZA, R. A.), 559
olymorphic repetitive sequence families in the genomes of mice, 209
orin, matrix, two-dimensional crystal packing; a channel forming protein in *Escherichia coli* outer membranes, 701
OSAKONY, J. W. (see also JACOBS, H. T.), 609
R4 (see also Bacteriophage), 109
RESCOTT, B. (see also THOMAS, G. J., JR), 321
rophage P1 and plasmid p15B, DNA restriction–modification genes; structure and *in vitro* transcription, 1
- — — — —, — ——— enzymes; subunit functions and structural homologies, 19
rotein, channel forming, in *Escherichia coli* outer membranes; two-dimensional crystal packing of matrix porin, 701
-, ribosomal, messenger RNAs for yeast, 79
urple membrane, fluorescence energy transfer studies of transmembrane location of retinal, 91

uaternary structure of α-ketoglutarate dehydrogenase complex; heterogeneity, 523

aman spectroscopic investigation of structure similarity, difference and variability in the filamentous viruses fd, If1, IKe, Pf1 and Xf, 321
ecA dependence of IS*1*-mediated tandem duplication of plasmid pBR322, 183
epeated sequences for mutations of the lysozyme gene of bacteriophage T4, 229
epetitions, tandem, and insertion sequences as sources of variation in a dispersed repeat family, 249
epetitive sequence families, novel, showing size and frequency polymorphism in the genomes of mice, 209
eplication fidelity of bacteriophage ϕX174 DNA *in vitro* and *in vivo*, 633
etinal in purple membrane, fluorescence energy transfer studies of transmembrane location, 91
NA complementary to a long dispersed repeat family (a possible transposon) of human DNA, 257
ibosomal protein messenger RNAs for yeast, 79
- — S4 immunochemical accessibility in the 30 S ribosome; interaction of S4 with S5 and S12, 357
iv protein and human Fc fragment crystals are isomorphous: further evidence for conformational flexibility in the hinge region of immunoglobulins, 559
OBERTS, J. W. (see also JACOBS, H. T.), 609
odent cells transformed with hepatitis B virus DNA, core and E antigen synthesis is associated with greater than genome length viral messenger RNAs, 683
OSE, D. R., SEATON, B. A., PETSKO, G. A., NOVOTNY, J., MARGOLIES, M. N., LOCKE, E. & HABER, E., Crystallization of the Fab fragment of a monoclonal anti-digoxin antibody and its complexes with digoxin, 203
OSENBUSCH, J. P. (see also DORSET, D. L.), 701

Rossmann, M. G., Abad-Zapatero, C., Murthy, M. R. N., Liljas, J., Jones, T. A. Strandberg, B., Structural comparisons of some small spherical plant viruses, 711
Roy, A., Danchin, A., Joseph, E. & Ullmann, A., Two functional domains in adenylate cyclase *Escherichia coli*, 197

S4 ribosomal protein, immunochemical accessibility in the 30 S ribosome; the interaction of S4 with and S12, 357
Saludjian, P. (see also Amit, A. G.), 415
Satellite 1 DNA (741 base-pair repeat), sequence organization and variation; tandemly repeated DN sequences from *Xenopus laevis*, 567
Scallop striated muscle, electron microscopy and image analysis of myosin filaments, 303
Schierbeek, A. J., van der Laan, J. M., Groendijk, H., Wierenga, R. K. & Drenth, Crystallization and preliminary X-ray investigation of lipoamide dehydrogenase from *Azotobac vinelandii*, 563
Scholey, J. M. (see also Kendrick-Jones, J.), 139
Schrickel, S. (see also Iida, S.), 1
Schultz, D. W. (see also Owen, J. E.), 229
Seaton, B. A. (see also Rose, D. R.), 203
Sequence analysis of the *Drosophila* small heat shock gene cluster at locus 67B, 35
— changes, DNA, of mutations in the histidine operon control region that decrease attenuation, 44
—, nucleotide, of the lysozyme gene of bacteriophage T4. Analysis of mutations involving repeat sequences, 229
— spanning the beginning of the insertion region in *Anacystis nidulans* flavodoxin, 754
— variations in a dispersed repeat family, 249
Sequences, DNA, mitochondrial, un the nuclear genome of *Strongylocentrotus purpuratus*, 609
—, —, tandemly repeated, from *Xenopus laevis*; dispersed clusters of a 388 base-pair repeating uni 587
—, —, — —, — — —; sequence organization and variation in satellite 1 DNA (741 base-pair repeat 567
—, inserted, induce topological modifications and template activation in chimaeric plasmids, 59
Serine (pro)enzymes, interaction with Kazal and Kunitz inhibitors, 543
Shi, J.-P. (see also Fersht, A. R.), 655
Sigmoid curves, a new approach to their measurement with enzyme kinetic and ligand binding dat 163
Simian virus 40 nascent strands, mapping of the 3′-end positions, 599
Slaughter, M. (see also Hovmöller, S.), 401
Smith, G. R. (see also Owen, J. E.), 229
Smith, R. C. (see also Kendrick-Jones, J.), 139
Smith, W. W., Pattridge, K. A., Ludwig, M. L., Petsko, G. A., Tsernoglou, D., Tanaka, M. Yasunobu, K. T., Structure of oxidized flavodoxin from *Anacystis nidulans*, 737
Southgate, R., Ayme, A. & Voellmy, R., Nucleotide sequence analysis of the *Drosophila* small he shock gene cluster at locus 67B, 35
Spherical plant viruses, small, structural comparisons, 711
Splicing of adenovirus 2 early region 1A mRNAs is non-sequential, 475
Stålhammar-Carlemalm, M. (see also Iida, S.), 1
Strandberg, B. (see also Rossmann, M. G.), 711
Strongylocentrotus purpuratus, mitochondrial DNA sequences in the nuclear genome, 609
Structural comparisons of some small spherical plant viruses, 711
— homologies and subunit functions for DNA restriction–modification enzymes of phage P1 a plasmid p15B, 19
— similarities and differences amongst neurofilaments, 393
— studies of cytochrome reductase. Improved membrane crystals of the enzyme complex a crystallization of a subcomplex, 401
— — — — —. Subunit topography determined by electron microscopy of membrane crystals of subcomplex, 287
Structure and *in vitro* transcription for DNA restriction–modification genes of phage P1 and plasm p15B, 1
— of alamethicin in solution; one- and two-dimensional ^{1}H nuclear magnetic resonance studies 500 MHz, 757
— — azurin from *Alcaligenes denitrificans* at 2·5 Å resolution, 501
— — oxidized flavodoxin from *Anacystis nidulans*, 737

ructure; quarternary, of α-ketoglutarate dehydrogenase complex; heterogeneity, 523
similarity, difference and variability in the filamentous viruses fd, If1, IKe, Pf1 and Xf; investigation by laser Raman spectroscopy, 321
VENSSON, C., PETTERSSON, U. & AKUSJÄRVI, G., Splicing of adenovirus 2 early region 1A mRNAs is non-sequential, 475

4 (see also Bacteriophage), 229
ANAKA, M. (see also SMITH, W. W.), 737
andem duplication, IS*1*-mediated, of plasmid pBR322; dependence on *recA* and on DNA polymerase I, 183
andemly repeated DNA sequences from *Xenopus laevis*. I. Studies on sequence organization and variation in satellite 1 DNA (741 base-pair repeat), 567
— — — — — — —. II. Dispersed clusters of a 388 base-pair repeating unit, 587
ARR, G. E., Determination of the sequence which spans the beginning of the insertion region in *Anacystis nidulans* flavodoxin (*Appendix* to SMITH, W. W. *et al.*, 737), 754
AYLOR, A. (see also OWEN, J. E.), 229
emplate activation and topological modifications are induced in chimaeric plasmids by inserted sequences, 59
HOMAS, G. J., JR, PRESCOTT, B., DAY, L. A., Structure similarity, difference and variability in the filamentous viruses fd, If1, IKe, Pf1 and Xf. Investigations by laser Raman spectroscopy, 321
-end mapping of Simian virus 40 nascent strands, 599
→ 5′ exonuclease activity of DNA polymerase III holoenzyme from *Escherichia coli*, contribution to specificity, 669
OOTH, P. J. (see also KENDRICK-JONES, J.), 139
opological modifications and template activation are induced in chimaeric plasmids by inserted sequences, 59
ranscription *in vitro* and structure for DNA restriction–modification genes of phage P1 and plasmid p15B, 1
: the mechanism of action of 5,6-dichloro-1-β-D-ribofuranosylbenzimidazole; a resistant human cell mutant with an altered transcriptional machinery, 461
roponin C and parvalbumin, determination of calcium sites using X-ray absorption near edge structure, 125
rypsin inhibitor, pancreatic, bovine, circular and circularly permuted forms, 407
SERNOGLOU, D. (see also SMITH, W. W.), 737
SUI, F.-P. (see also BANERJEE, U.), 757
SUI, W.-C. (see also FERSHT, A. R.), 655
ULEY, E. (see also BARNES, W. M.), 443

LLMANN, A. (see also ROY, A.), 197
RANO, Y. (see also KOMINARI, R.), 209

AN DER LAAN, J. M. (see also SCHIERBEEK, A. J.), 563
ertebrate smooth muscle myosin, the effect of phosphorylation of the 20,000 M_r light chain, 139
IBERT, P. & CRAIG, R., Electron microscopy and image analysis of myosin filaments from scallop striated muscle, 303
iral messenger RNAs, greater than genome length, are associated with core and E antigen synthesis in rodent cells transformed with hepatitis B virus DNA, 683
IRTANEN, A. & PETTERSSON, U., The molecular structure of the 9 S mRNA from early region 1A of adenovirus serotype 2 (*Appendix* to SVENSSON, C. *et al.*, 475), 496
irus, SV40, mapping of the 3′-end positions of nascent strands, 599
iruses, filamentous, fd, If1, IKe, Pf1 and Xf; structure similarity, difference and variability studied by laser Raman spectroscopy, 321
, plant, spherical, small, structural comparisons, 711
OELLMY, R. (see also SOUTHGATE, R.), 35

/AGENKNECHT, T., FRANCIS, N. & DEROSIER, D. J., α-Ketoglutarate dehydrogenase complex may be heterogeneous in quaternary structure, 523
/AIS-STEIDER, C., EAGLES, P. A. M., GILBERT, D. S. & HOPKINS, J., Structural similarities and differences amongst neurofilaments, 393
/ARNER, J. R. (see also KIM, C. H.), 79
/EINMANN, R. (see also MITTELMAN, B.), 461

Weiss, H. (see also Hovmöller, S.), 401
— (see also Karlsson, B.), 287
Wierenga, R. K. (see also Schierbeek, A. J.), 563
Winkelmann, D. A. & Kahan, L., Immunochemical accessibility of ribosomal protein S4 in the 30
ribosome. The interaction of S4 with S5 and S12, 357
Wonacott, A. J. (see also Leslie, A. G. W.), 375
Wright, A. J. (see also Bardsley, W. G.), 163

Xenopus laevis tandemly repeated DNA sequences; dispersed clusters of a 388 base-pair repeating un
587
— — — — — —; organization and variation in satellite 1 DNA (741 base-pair repeat), 567
Xf (see also Viruses, filamentous), 321
Xin, J.-H. (see also Jacobs, H. T.), 609
X-ray absorption near edge structures (XANES) determination of calcium sites of troponin C a
parvalbumin, 125
— investigation, preliminary, of lipoamide dehydrogenase from *Azotobacter vinelandii*, 563

Yasunobu, K. T. (see also Smith, W. W.), 737
Yeast, mRNA for ribosomal proteins, 79
Yoshikura, H. (see also Kominami, R.), 209

Zandomeni, R. (see also Mittelman, B.), 461
Zannis-Hadjopoulos, M., Chepelinsky, A. B. & Martin, R. G., Mapping of the 3′-end positions
Simian virus 40 nascent strands, 599